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TITLE: GaN SINGLE CRYSTAL SUBSTRATE AND MANUFACTURE THEREOF

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INVENTOR-INFORMATION:

NAME

COUNTRY

MOTOKI, KENSAKU

N/A

NISHIMOTO, TATSUYA

N/A

OKAHISA, TAKUJI

N/A

MATSUMOTO, NAOKI

N/A

ASSIGNEE-INFORMATION:

NAME

COUNTRY

SUMITOMO ELECTRIC IND LTD

N/A

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ABSTRACT:

PROBLEM TO BE SOLVED: To form a self-support GaN crystal having a possible wide area on a GaAs substrate by laying a mask having windows distributed with equal spacings on the GaAs substrate, forming a GaN layer on the masked part, and removing the GaAs substrate.

SOLUTION: An SiN layer is formed on a GaAs substrate, regularly distributed windows are bored through it, there are three kinds of windows: staggered dot window, <11-2> and <1-10> stripe windows. Using thus windowed SiN as a mask, a GaN buffer layer and epitaxial layer are formed. The GaAs substrate covered with the mask having periodical windows is set in an HVPE apparatus to deposit GaN on the substrate, thus forming a GaN buffer layer on the GaAs substrate, and GaN is epitaxially grown on the buffer layer through the windows, the substrate is etched off with aqua regia to form a crystal of GaN only, both sides are polished to form a GaN single crystal substrate, and this is a self-supporting film.

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